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(54) Insulated container

(57) An insulated container has a frame (1), an outer sheet wall (2), an insulating layer (3) and an internal lining of panels (4, 5, 14). So that the interior face of the lining avoids cavities and other shapes liable to collect dirt or tear packages put into the container, the joints between adjacent panels being formed by projections (19, 20) received in grooves (10, 11) with resilient deformation of the projection and/or the groove.

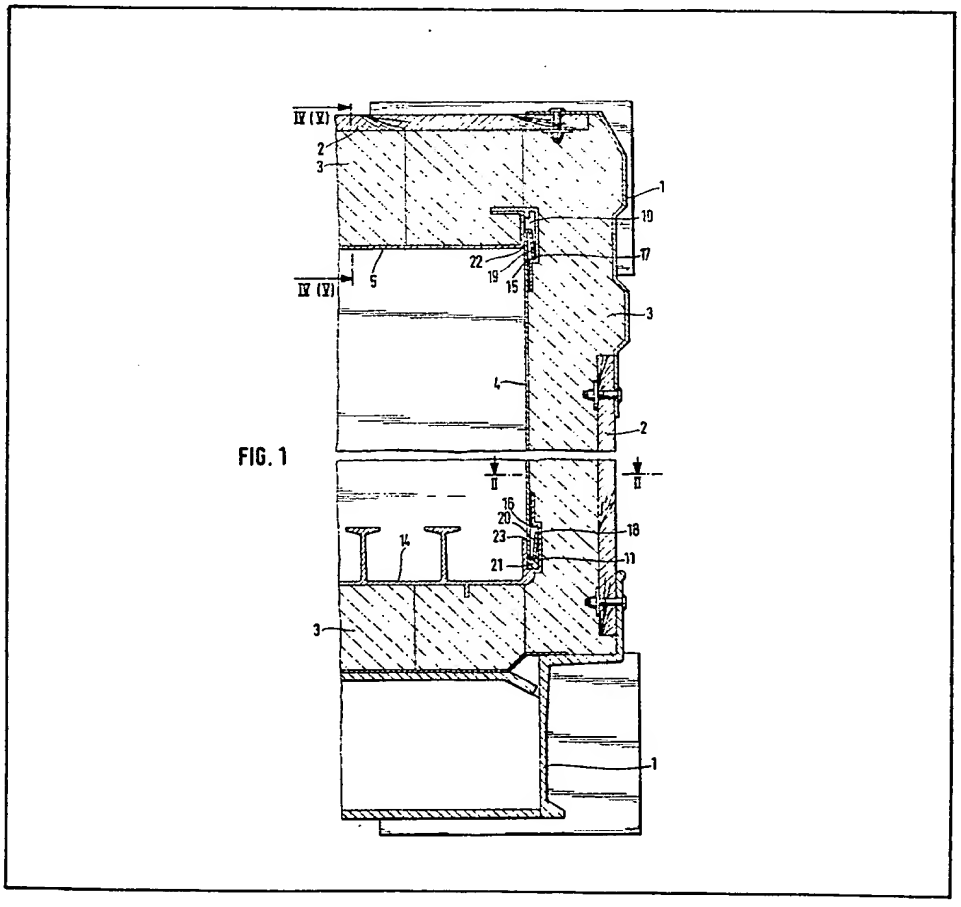

FIG. 1

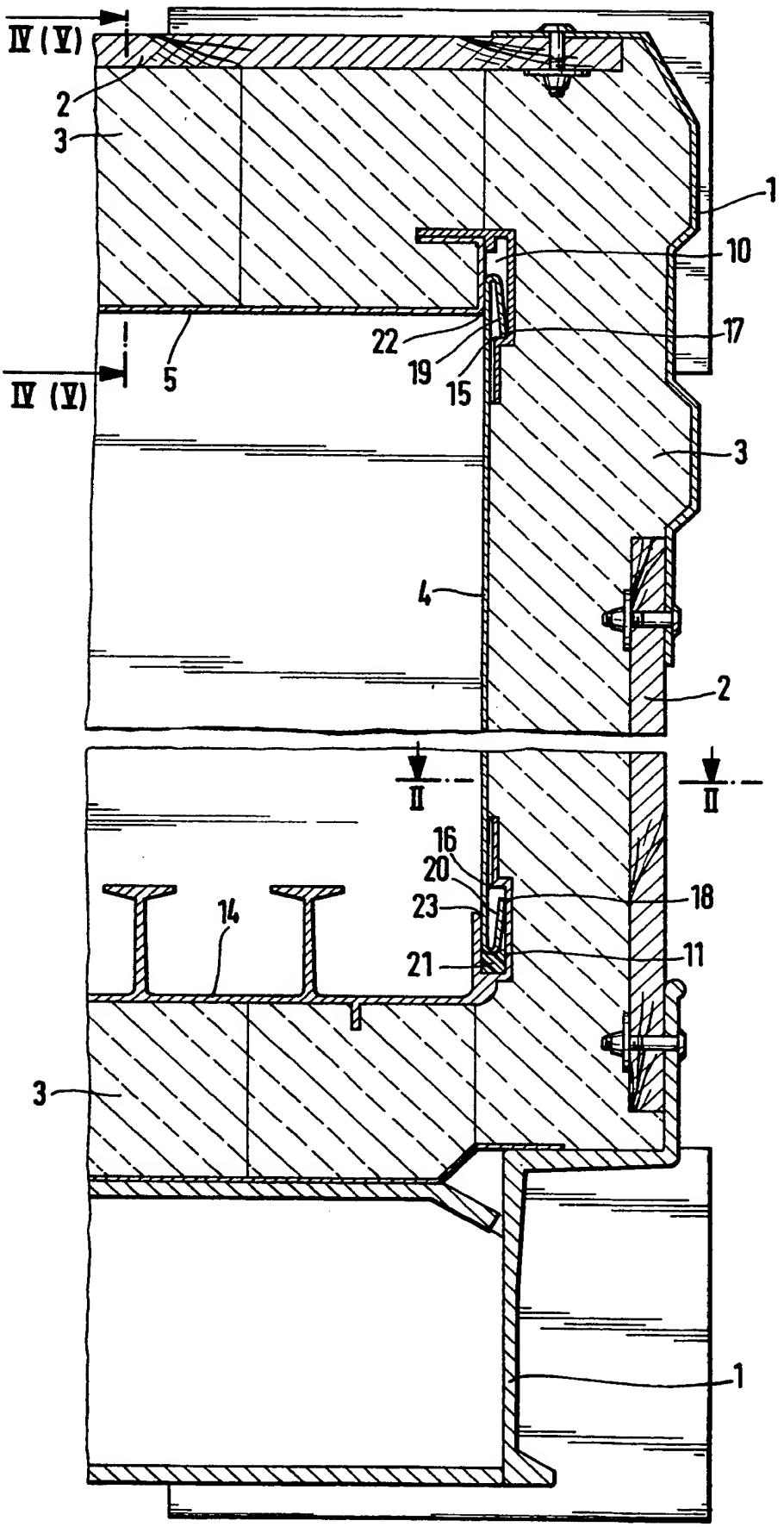

FIG. 1

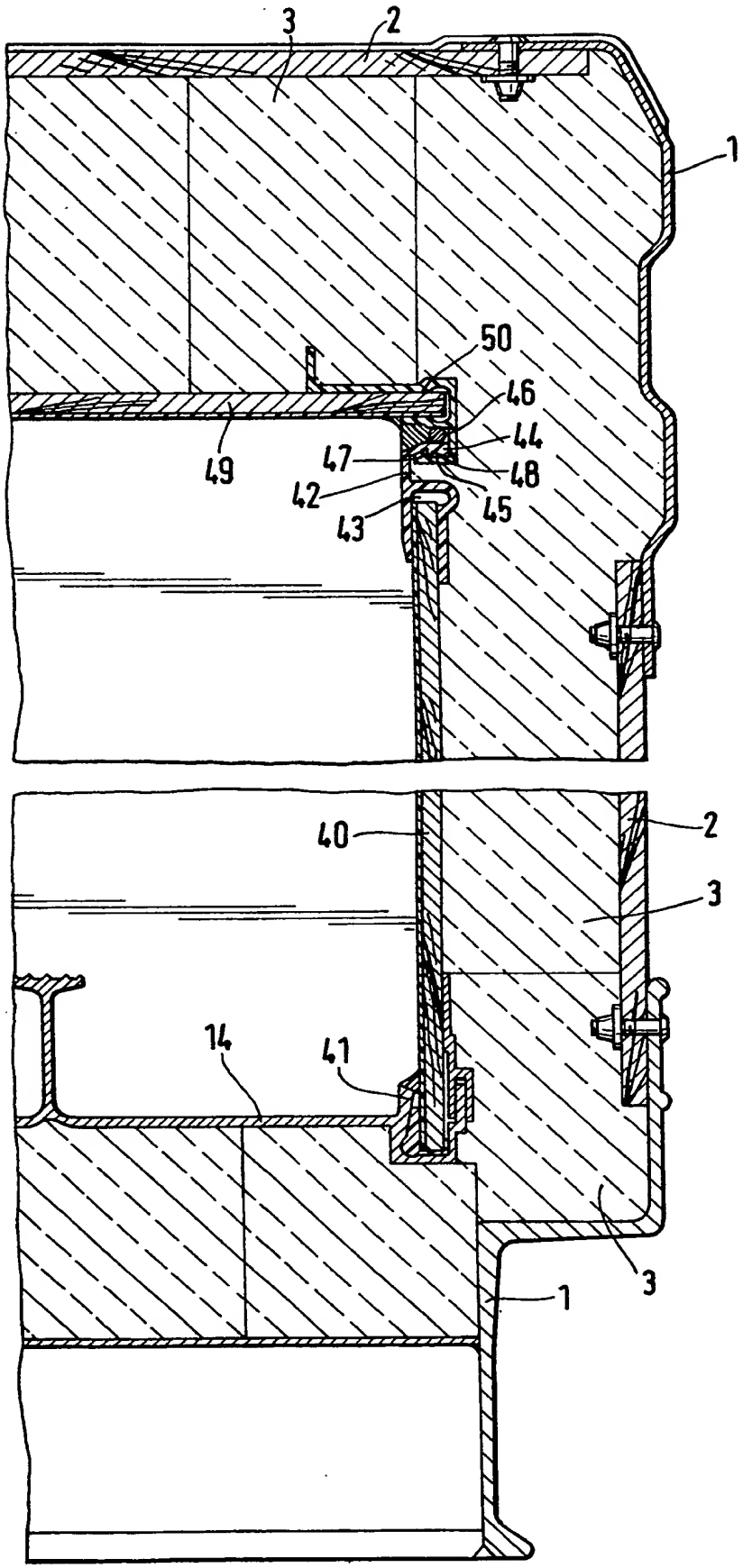

FIG. 1a

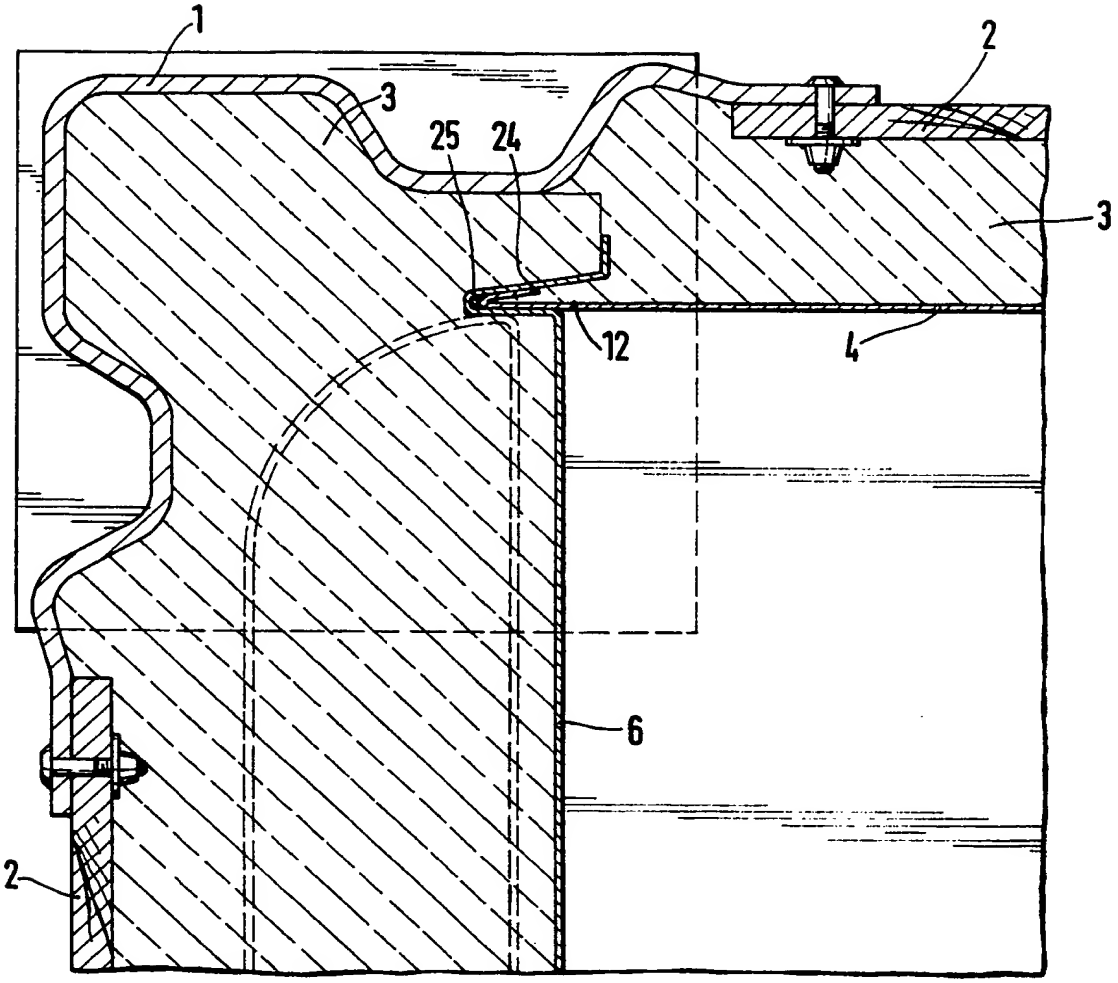

FIG. 2

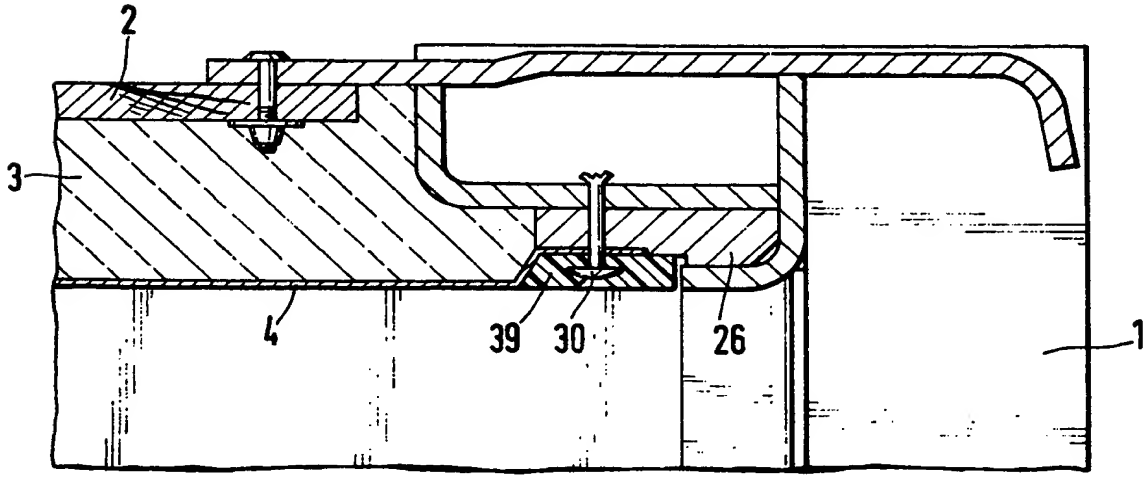

FIG. 3

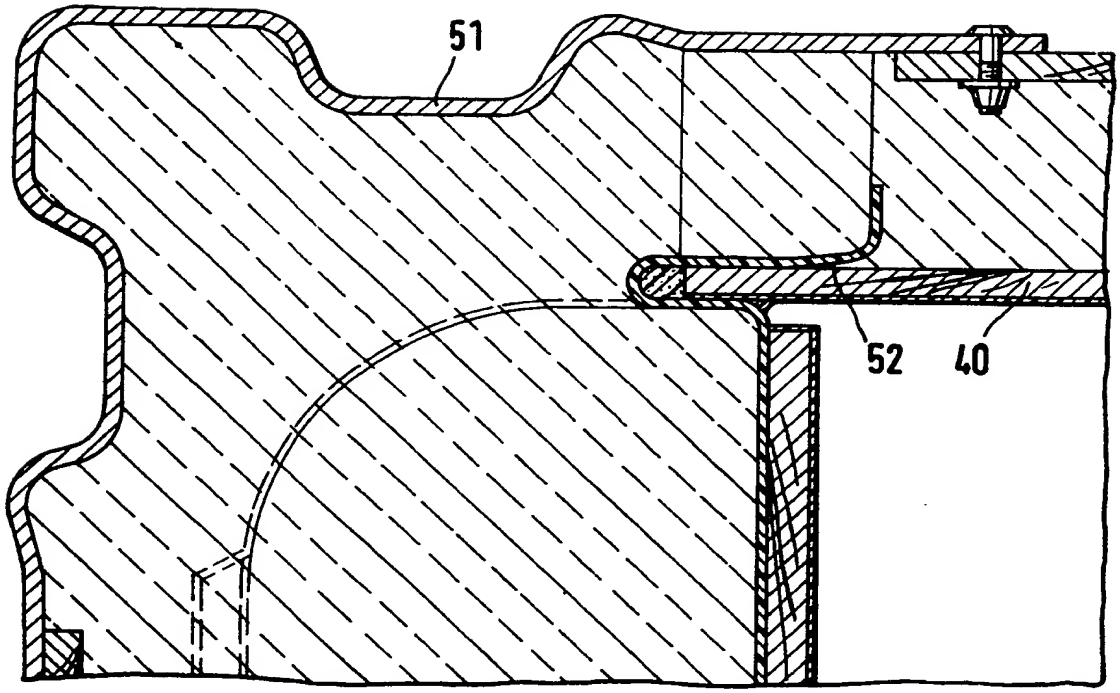

FIG. 2a

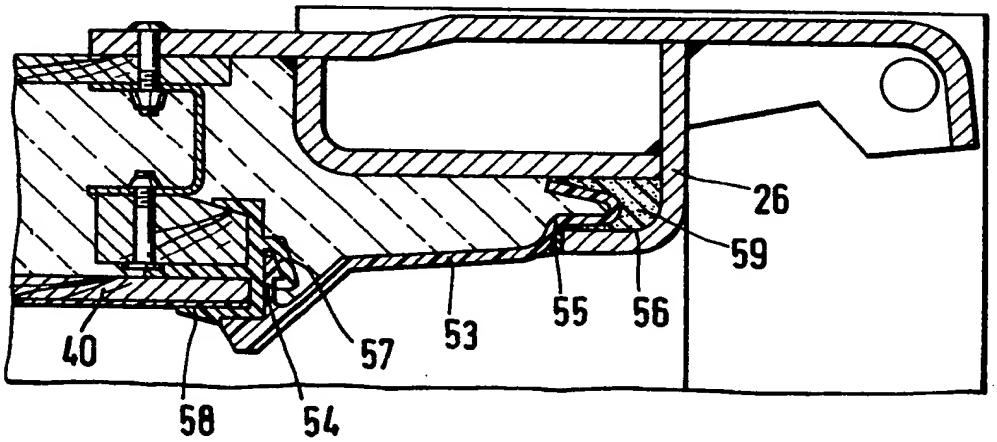

FIG. 3a

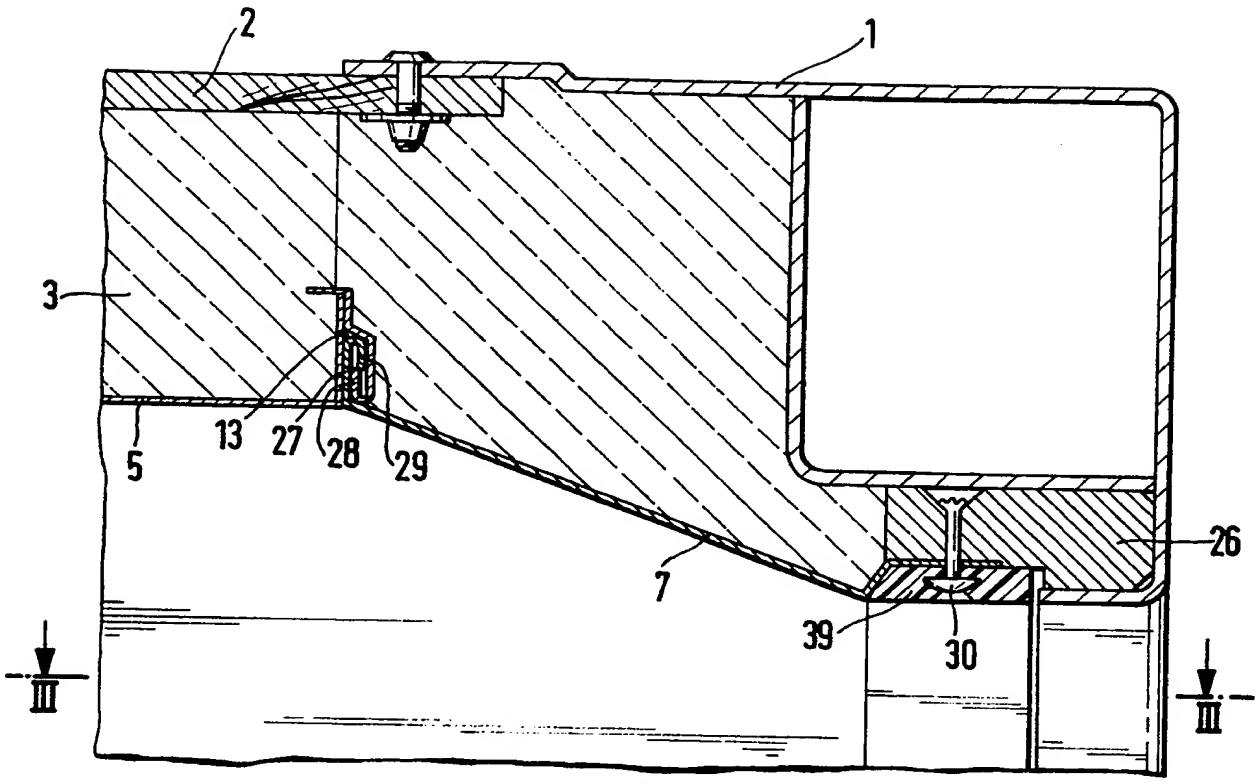

FIG. 4

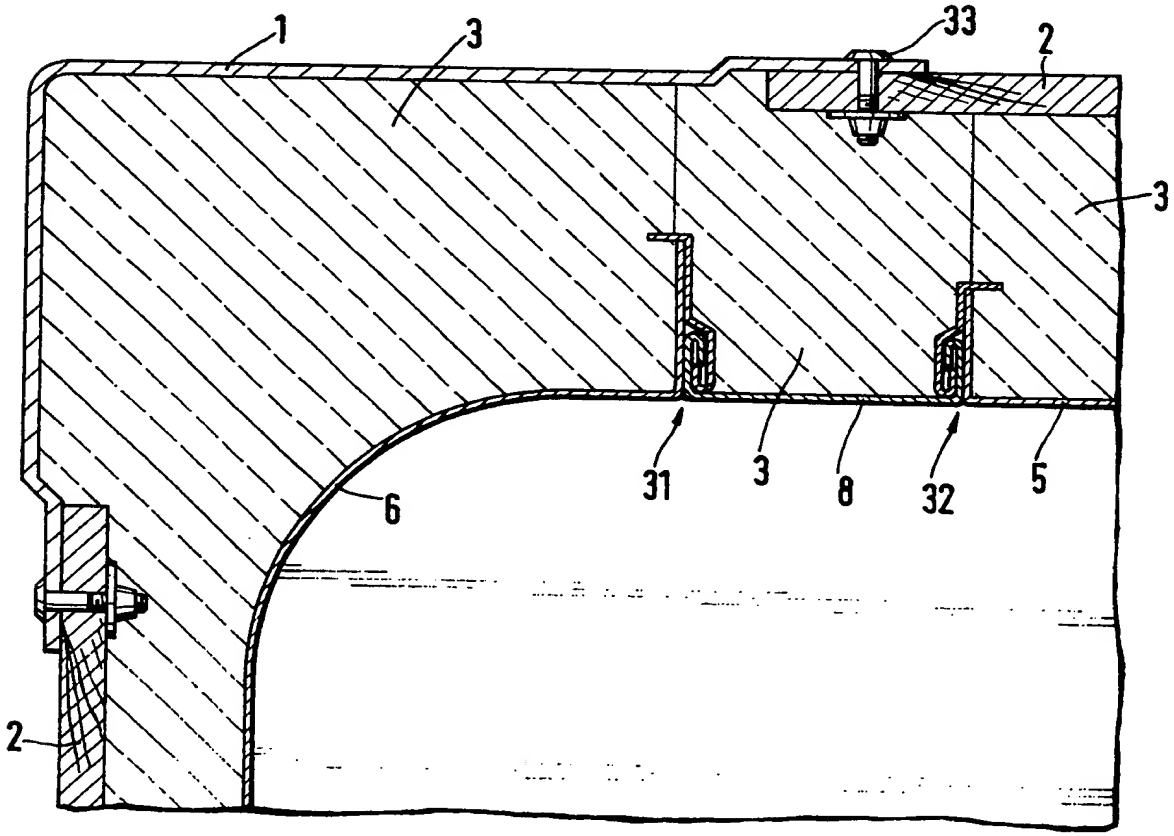

FIG. 5

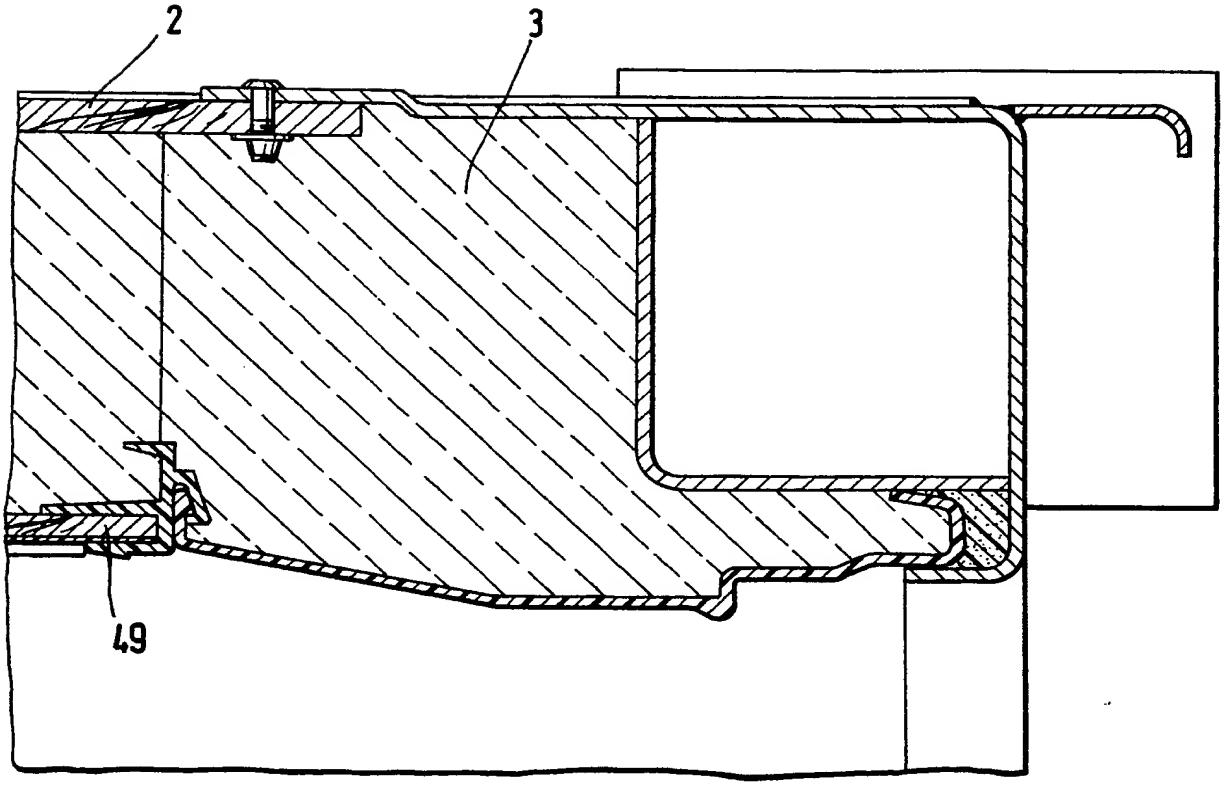

FIG. 4a

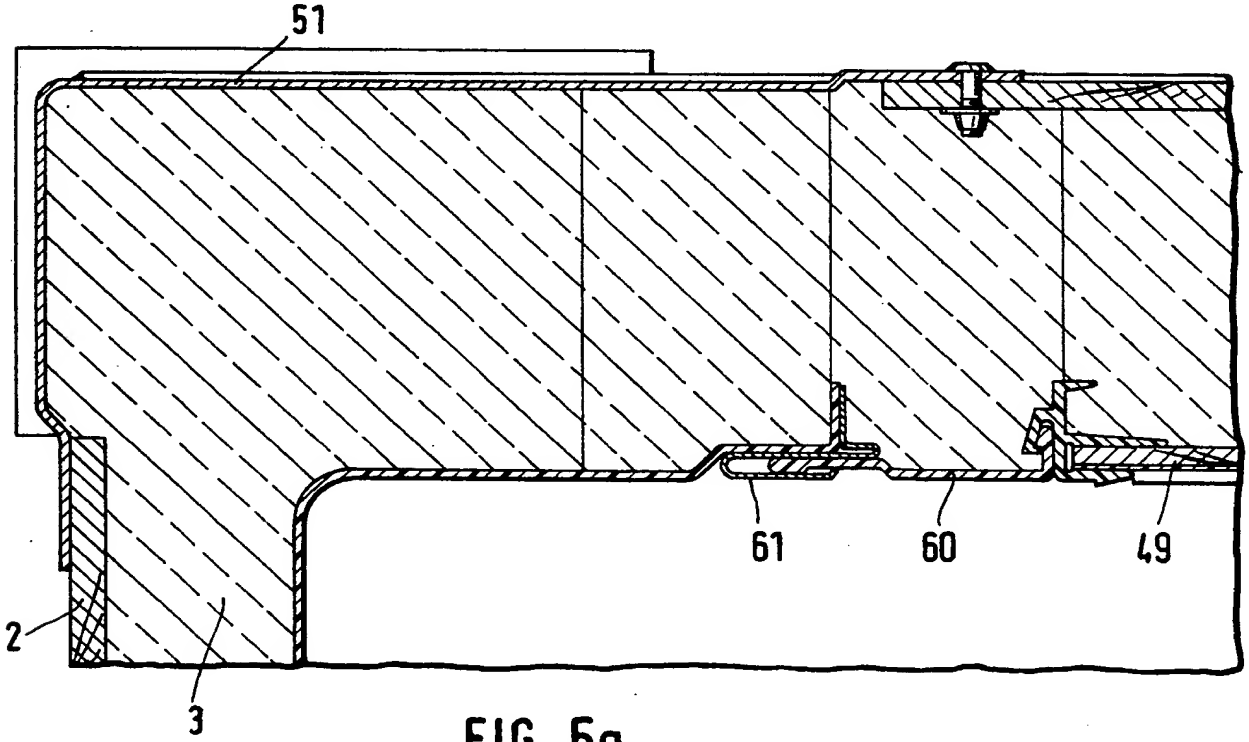

FIG. 5a

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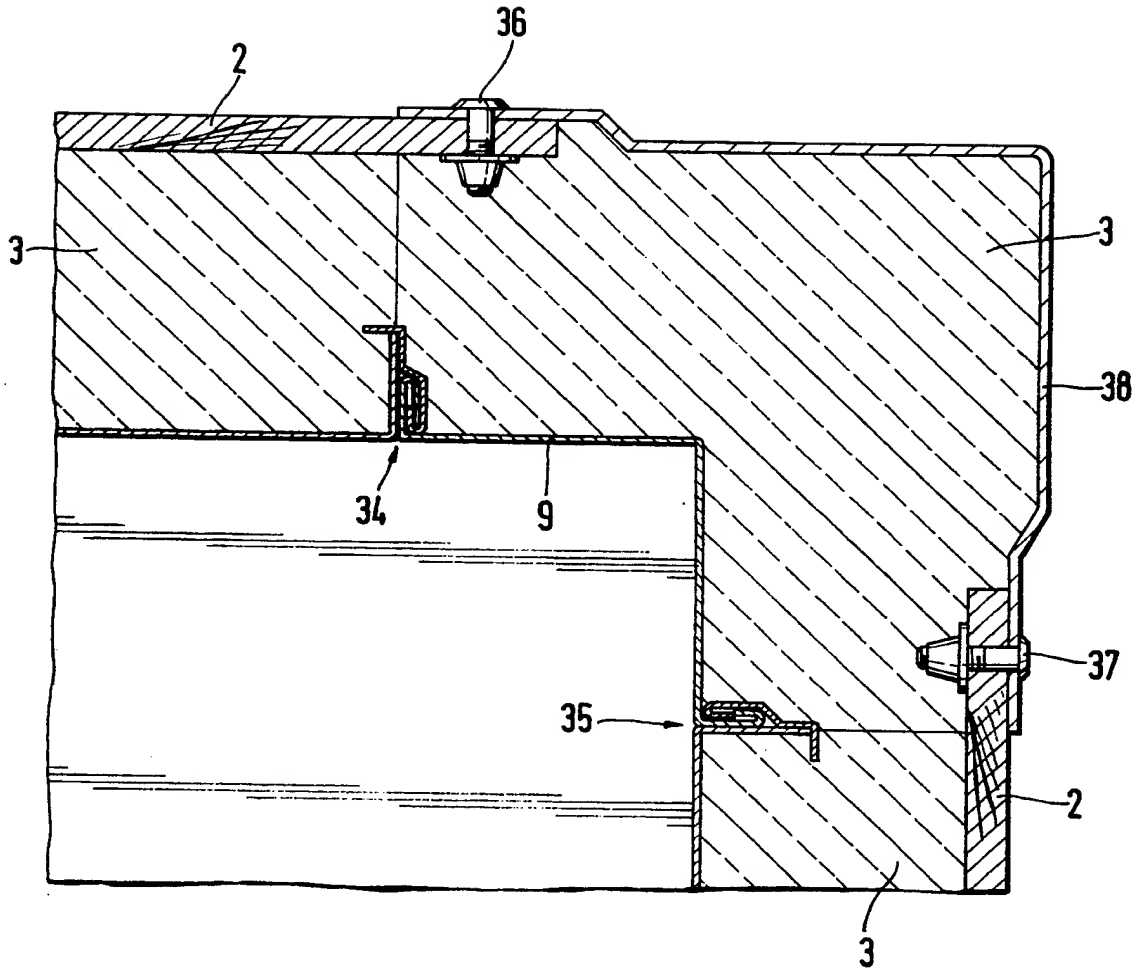

FIG. 6

SPECIFICATION

Insulat d container

The present invention relates to an insulated container consisting of a frame, an outer sheet wall, an insulating layer and an internal sheet lining, in which the lining comprises separate panels.

Such containers are used for transporting fruit and refrigerated goods. During the assembly of the container it is known to produce the necessary joints by riveting and to provide the insulation either by foaming out after the outer wall and the inner wall have been produced and assembled or by putting the container together as prefabricated components consisting of the outer wall sheet, the insulation layer and the inner lining. In known refrigerated containers, the joints of the internal lining are frequently produced by overlapping angle sections which are screwed or riveted to adjacent sheet-metal panels. Also known are one-sided riveted or screwed joins which are produced by bordering a sheet-metal surface or by suitable shaping of adjacent aluminium or plastics sections.

In all known refrigerated containers, the internal lining at the joints, which are formed during the assembly of the wall surfaces, such as the floor to the side wall, the side wall to the roof, doors, etc., is not smooth but, instead, has hollow spaces in the case of the blind rivets or has gaps under rivet heads and screws, on which the goods packed in the container, such as cartons, can tear open when being pushed in. The spaces or gaps, particularly in respect of hygiene, are extremely undesirable as providing a breeding place of micro-organisms. Moreover, the production of the joints of the internal lining through individual securing elements is expensive and, with the large expanse of the very thin walls of which the internal lining consists, is difficult.

The object of the present invention is to provide an insulated container in which the internal lining which at its joints is smooth, rivet-free and screw-free and which can be assembled simply, reliably and rapidly, with the avoidance of gap formation.

According to the invention there is provided an insulated container having a frame, an outer wall formed of sheet material, an insulating layer within the outer wall and an internal lining comprising a plurality of sheet panels within the insulating layer, wherein at least one pair of adjacent panels of the lining are joined together at a joint between adjacent edges of the panels by means of a projection provided on a first one of the panels and a groove provided on the second panel, the projection and groove both extending along substantially the whole length of the joint and the projection being inserted in the groove with resilient deformation of the projection and/or the groove. The projection and groove can be arranged to be pushed together. The ability to push one into the other enables easy assembly; e.g. the sheet or panel of a vertical end wall can be readily pushed into grooves extending along edges of the panels forming the ceiling, floor and two side walls, which extend perpendicular to the end wall. Due to elastic deformation of the projection and/or the groove, a tight fit of th edge region of the sheets or panels against a groov wall can be achieved to provide a smooth interior to the inside of the container. Because the sheets of the internal lining need not be fixed in position at individual points by rivets or screws, buckling of the material and gaps can be reliably avoided.

The groove and projection of the joint may be formed in one-piece with the respective lining panels, or either or both of them may be formed by a separate element, e.g. a plastics section, secured to the panel edge.

The resilient deformation of the projection and/or the groove walls may occur only during the insertion of the one in the other, e.g. as may be the case in a latching engagement, or may persist after the insertion operation in which case the resilient bias may usefully form a seal.

Advantageously, the groove constitutes a recess located exteriorly of the first panel and open towards the first panel, the projection engaging in the recess and having a surface adapted to abut a side wall thereof so as to prevent lateral movement of the first panel in at least one direction. This arrangement can ensure, by means of the elastic restoring forces of the edge and/or the groove, a reliable clamping after a simple pushing-in operation. Such a joint may be provided at the upper horizontal joint of a suspended vertical panel at which the co-operating edges of groove and panel edge enable without further measures, an exact horizontal alignment and a reliable join. This type of joint may naturally also be applied at other points which are not under tensile stress, e.g. in a floor-side wall join, where the joint has predominantly a securing function.

In such a case the recess of the groove of the one panel and the surface of the projection abutting it expendiently extend substantially over the entire length of the joint in order to favour uniformity of clamping and support of the panels to provide a smooth fit of the panel in the groove.

The elastic deformation is preferably chosen so that when the panel edge is pushed into the groove the edge region of the panel is pressed in a sealing manner against the groove wall as a result of the elastic restoring forces. A tight enough insertion of the panel edge in the groove can be achieved such that when pressure is applied to the sheet in a foaming out operation of the intermediate space between the internal lining and the outer wall sheets plastics foam does not emerge at the joint between two panels.

In one form of the container which has an internal lining consisting of sheet-metal panels (which is particularly well suited for the foaming out of the side walls in the already assembled state and which accordingly has a relatively small number of joints) a vertical panel is suspended by the abutment of its projection at its upper edge with the said side wall of the groove in which that projection is inserted, while the lower edge of the vertical panel does not reach to the lowermost side wall of the groove at the joint to the floor panel.

Since the height of the vertical metal panel, the spacing of the upper groove from the lower groove,

the spacing of the projections in the groov s and th height of the spring projection ar so matched to one another that the metal sheet in the suspended state when supported by the projection in the upper groove can hang freely, without touching the bottom f the lower groove, a completely smooth, undisturbed suspension of the metal sheet is ensured. Such a result has not heretofore been achieved with the metal sheet usually employed having a thickness in the range of from 0.8 to 1.25 mm, a height of about 2.3 metres and a breadth of 5.8 metres, which are formed in the known containers and are joined by riveting.

The possibility of even small amounts of foam emerging from the joints in the case of the foaming out of the walls can be decreased still further by filling the bottom of the lower groove with a sealing composition, which contacts the lower edge of the panel. When the foam rising from below in an upward direction reaches the upper joint of the panel, the foam viscosity has already increased to such an extent that an adequately reliable seal is provided by the projection-and-groove engagement.

Vertically extending joins of the internal lining are expediently formed as follows:
at the joints between the adjacent vertical panels, the first panel has a bent back portion providing said projection and the second panel has a groove in which an edge portion of the first panel and said projection are received with resilient deformation. The smooth forming of the groove enables a tolerance vis-a-vis the insertion of the sheet edge; the folded, resilient portion strip ensures, even when it is inserted to varying depths, a smooth fit of the pushed-in sheet against that wall of the groove which lies towards the inside of the container. In this vertically extending joint, a sealing agent along the base of the groove can increase the sealing reliability of the joint during foaming out.

For the smooth mutual joining of two metal sheets or panels at an obtuse angle to each other or lying in ne plane, a joint is particularly suitable in which the gro ve of the one metal panel and the projection along the edge of the other metal panel are produced through folding an edge strip of each sheet, so that a snap-action joint is formed. The elastic (resilient) restoring forces can thus be produced through elastic deformation of the groove. The dimensions of the groove and the folded projection may be chosen so that a stepless join of the two metal panels is formed.

The invention is, in particular, suitable for the assembly of the container, at least in part, from ready foamed-out walls or wall elements. For each two inner panel edges which are to be joined there can be arranged a joint of the invention, and, suitably parallel to this join, one or more joints of sheets forming the outer wall with the frame.

At the junctin of two panels forming the inner lining in particular when metal sheets are used, a sealing agent may be applied. Suitable for this purpos is an elastic one-component sealing material based on silicone rubber.

It is also possible to line the insulated container with an internal lining of wooden panels coated with plastics material, and plastics parts. In this form of the invention, smooth, rivet-free and screw-free joins at the join points can be assembled simply, reliably and rapidly, with avoidance of gap formation, without resorting to the measure of so constructing the edges of the two panels that they can be pushed into one another, with elastic deformation. The high intrinsic stability of the panels enables this elastic deformation to be dispensed with, the gap-free join of the panels to one another nevertheless remaining ensured.

Advantageously, in such a case, at the joint the edge portion of the said wood panel is received in a groove of a plastics section which has an element constituting the said projection, the projection being engaged with a snap-action in the said groove which is open in the direction perpendicular to the said edge portion of the wood panel. This allows the pressing together of the groove and the projection when the panels are already brought into their assembled position.

A safeguarding of the joint is achieved if the groove and projection received therein are locked together in the manner of a latch by means of undercut surfaces. For the groove-projection joint of a side panel to the ceiling panel, an embodiment has been found satisfactory in which the groove is wider than the projection received therein, and support means are provided to urge the projection against a side wall of the groove to maintain the latched condition of said undercut surfaces. This embodiment ensures the necessary tolerances during the insertion of the comparatively heavy inner side panels of the container, afford a reliable joint. The support means for the projection can also provide a good seal against the emergence of foam during foaming out. The plastics sections are advantageously secured on the sheets by means of groove-shaped pockets.

For the bridging of elongate gaps between panels or between panels and other adjacent parts of the container a plastics member is preferably provided, this member at one of its edges providing the said projection and the groove being provided by a said plastics section secured to the edge of the wood panel (or vice versa), the plastics member at its opposite edge being mounted in a manner permitting pivotting about that edge to permit insertion of the projection in the groove. The said opposite edge of the plastics member may be slidable perpendicularly to that edge. This slidability and pivotability need be present, and should be present, to only a small extent, so that it suffices for tolerance compensation and for the introduction of the projection into the groove without leaks occurring at the pivot point of the member. The pivot point may be constructed as pocket into which th plastics member engages in sealing manner, with slight pretensioning; moreover, a back lining with foam rubber may also be provided. It is also possible to construct the pivot point as bendable pocket consisting of sheet metal, in which the plastics member is slidably mounted.

Embodiments f the present invention will now be described by way of example with reference to the accompanying drawings; wherein

Fig. 1 shows a vertical section through the joints of roof to side wall and side wall to floor of a container;

Fig. 2 shows a horizontal section through the joint of the side wall and the end wall;

Fig. 3 shows a horizontal section through the joint of the side wall and door frame;

Fig. 4 shows a vertical section through the joint of the roof and door frame;

Fig. 5 shows a vertical section through the joint of the roof and end wall;

Fig. 6 shows an alternative form of the joint of roof and side wall in vertical section;

Figs. 1a, 2a, 3a, 4a and 5a are views corresponding to those of figures 1 to 5 of another container of the invention in which the internal lining consists of plastics material and plywood sheets.

Referring firstly to Figs. 1 to 5 the container has a steel frame 1, outer wall sheets 2, insulation 3 and an internal lining consisting of sheet-metal panels 4 to 9. Joints between adjacent sheet-metal panels 4 to 9 are produced during the assembly of the internal lining and each consist of a groove 10, 11, 12, 13 in one sheet extending substantially over the entire length of the joint line and a projection at the edge of the other metal sheet. The projection likewise extends substantially over the entire length of the joint and the joint is arranged so that the projection and the groove 10, 11, 12, 13 can be pushed one into the other with elastic (resilient) deformation of the projection and/or of the groove 10, 11, 12, 13. Instead of sheet metal, the material for the internal lining may alternatively consist wholly or partially of, for example, wood or glass-fibre-reinforced plastics material.

As shown in Fig. 1 the groove 10 extends horizontally along a side of the sheet-metal panel 5 which acts as a roof and the groove 11 extends horizontally along a side of the floor sheet 14. The grooves 10 and 11 are in each case provided with a surface 15, 16 respectively which, seen in end view, forms a projecting ledge. The sheet-metal panel 4 which forms a vertical side wall has flanges which project outwardly with respect to the container so that their respective edges 17, 18 can co-operate with respective surfaces 15, 16 in grooves 10, 11. The flanges are each formed by a resilient, sheet-metal edge strip of the panel 4 which is folded outwardly to form an acute angle with the panel 14 so as to act as a spring catch 19, 20. During the assembly of the container, when the floor, roof and corresponding wall sheet 2 are already rigidly mounted in their respective positions, the side metal sheet 4 is introduced into the grooves 10, 11. The sheet 4 settles down with the upper spring 19 resting on to the surface 15 of the upper groove 10 and so hangs freely. The outwardly biassed spring catches 19, 20 ensure sealing of the grooves 10, 11 from the space between the side panel 4 and the outer wall sheet 2, which space is subsequently to be foamed out for the insulation 3. In the groove 11 of the floor sheet 14 a sealing composition 21 is provided along the bottom of the groove 11. During the foaming out of the side wall, during which pressures of up to 2 atmospheres can occur, the inner panel 4 and the outer wall sheet 2 are supported. The spring joints are able to prevent the emergence of the foam. Subsequently, a silicone rubber sealing composition is applied along the lines 22, 23 at which the side wall metal sheet 4 emerges from the grooves 10, 11.

As shown in Fig. 2, the join of the side sheet 4 to the internal lining panel 6 forming an end wall is accomplished by a vertically extending smooth groove 12 into which is pushed a spring catch 24 of the internal lining 4 which is folded outwardly at an acute angle. In the bottom of the groove 12 there is an additional sealing composition 25 consisting of silicone rubber. The securing of the side sheet 4 on a door frame 26 is effected as shown to Fig. 3, by means of a rivet join 30 which lies covered and is therefore harmless.

For joining the roof lining 5 to a door frame 26, as shown in Fig. 4, the metal sheet 7, which has a resilient spring projection 27, is pushed into a groove 13 extending along an edge of the already mounted metal sheet 5. A projection 28 in the groove 13 of the metal sheet 5 and a projection 29 of the spring 27 of the metal sheet 7 are each produced by folding an edge strip of the respective metal sheets. The groove depth and the lengths of the folded portions are matched to one another so that, in the pushed-in state, a projection-free, smooth inner edge is formed. The space lying behind the metal sheet 7 may be foamed out in one operation together with the space behind the side wall metal sheet 4 (see Fig. 1). The securing of the metal sheet 7 to the door frame 26 is effected – as in the join of the side wall lining 4 as shown in Fig. 3 – with a rivet join 30 which lies covered.

As shown in Fig. 5 the transition from the roof to the end wall is rounded off on the inside. The joints, located in the roof consist of two groove-spring joints 31, 32 which extend parallel to the respective container edge, and into which a connecting metal sheet 8 is pressed so that the groove-spring joins 31 and 32 lock. Parallel to the groove-spring joints there extends a joint 33 of the outer wall sheet 2 with the outer steel frame 1. The insulation here may be introduced simultaneously with the foaming out of the side wall spaces on the metal sheets 4 (Fig. 1).

The embodiment of the container illustrated in Figs. 1 to 5 is advantageously assembled in such a manner that prefabricated units are used for the roof, the floor and the end wall, each unit consisting of the internal lining, in particular sheets 5, 6 with their respective grooves 10, 11 and the outer wall sheets 2 with foaming out of the intermediate space (insulation 3) already effected. The above described assembly of the side walls (with the lining 4) and the intermediate pieces (with the linings 7, 8) is then carried out.

In the embodiment of the container illustrated in Fig. 6 two groove-spring joints 34, 35 are present in the container inner lining. Extending parallel thereto are two joints 36, 37 of the outer wall sheets 2 with the steel frame 1. In particular in this embodiment, all adjacent walls of the container may be mounted as foamed-out prefabricated units. The connection of the internal lining of the adjacent walls is obtained by insertion of the metal corner sheet 9 so that the groove-springs 34, 35 lock. Subsequently, the insulation 3 between the corner sheet 9 and its outer cover

38, which is joined to the steel fram , is introduced.

In the embodiment of Figs. 1a-5a, the refrigerated container again consists of the steel frame 1, the outer wall sheets 2 and the insulation 3. The internal lining is formed of plastics material and plywood sheets coated with glass-fibre-reinforced plastics material. The joints formed between the sheets during the assembly of the internal lining each consist of a groove in one sheet running substantially over the entire length of the joint line and of a projection at the edge of the other sheet also running substantially over the entire length of the joint line. Thus the groove of the one sheet and the projection at the edge of the other sheet can be pushed tightly into engagement one with another, with formation of smooth joint edges without projections internally.

As Fig. 1a shows, a plywood sheet 40 forming the side wall of the lining (this being a sheet 40 coated with glass-fibre-reinforced plastics material) stands at its lower edge in a groove 41 in the floor sheet 14. On the upper edge of the sheet 40 there is placed a moulded plastics section 42 which has a groove 43 to grip the edge of the sheet 40. The section 42 has a latch 44 which engages with a spring action in a groove 45 which is open in a direction perpendicular to the direction of the sheet 40 as seen in Fig. 1a. The groove 45 is substantially wider than the latch 44, so that enough play is available for the assembly. The latch 44 is pressed against the opposed bottom of the groove 45 by a round plastics cord 46; the projections 47, 48 on opposed faces of the groove 45 and the latch 44 ensure a locking latch action. The space in the groove 45 in front of the cord 46 is then filled with plastics material. The join to the roof sheet 49 is produced by another groove 50 of the moulding providing the groove 45, which grips the edge of the sheet 49.

Figs. 2a and 3a show how an edge of the plywood sheet 40 at the end wall 51, which sheet is coated with glass-fibre-reinforced plastics material, is pushed into a groove 52 which is open towards it. The joint to the door frame 26 is effected by a moulded plastics section 53 which at one edge 55 is mounted in a pocket so as to be pivotable vertically about the edge 55 as seen in Fig. 3a.

At the opposite edge of the section is a spring latch 54 which engages in a groove 57 with elastic deformation of the groove 57; the groove 57, and the latch 54 are thus locked together by projecting edges providing undercut surfaces. The groove 57 is in another plastics section which is located on an edge of the side wall sheet 40 by means of another groove 58. The section 53 seals against the pocket 56 through elastic pretensioning. An additional foam 59 in the pocket 56 safeguards against the emergence of the foam of th insulation of the container during foaming out. The longitudinal slidability of the section 53 in the pocket 56 gives the necessary tolerance for the exact introduction of the latch 54 into the groove 57.

The joint of the roof sheet 49 to the door frame shown in Fig. 4a is similar to the joint of the side wall to the door frame as shown in Fig. 3a. Again two plastics mouldings are used, being locked together by a latching action.

In the joint of the roof sheet 49 to the end wall shown in Fig. 5a, a plastics section 60 is mounted slidably in a sheet-metal pocket 61 attached to one lining sheet. As the pocket 61 is flexible, the section 60 can pivot to cause engagement of a projection at its other edge in a groove of a moulded section mounted on the edge of the panel 49.

CLAIMS

1. An insulated container having a frame, an outer wall formed of sheet material, an insulating layer within the outer wall and an internal lining comprising a plurality of sheet panels within the insulating layer, wherein at least one pair of adjacent panels of the lining are joined together at a joint between adjacent edges of the panels by means of a projection provided on a first one of the panels and a groove provided on the second panel, the projection and groove both extending along substantially the whole length of the joint and the projection being inserted in the groove with resilient deformation of the projection and/or the groove.

2. A container according to claim 1 wherein the shape of the groove and projection are such that in the inserted position, respective surfaces of the groove and projection are resiliently urged into contact so as to provide a seal.

3. A container according to claim 1 or claim 2 wherein said groove constitutes a recess located exteriorly of the first panel and open towards the first panel, the projection engaging in the recess and having a surface adapted to abut a side wall thereof so as to prevent lateral movement of the first panel in at least one direction.

4. A container according to claim 3 wherein the said recess and the surface of the projection adapted to abut it both extend substantially the whole length of the joint.

5. A container according to claim 3 or claim 4 having a plurality of said joints respectively at the edges of roof and floor panels of the lining and connecting those edges to the edges of vertical panels of the lining, the groove in each case being on the roof or floor panel and having an overhanging surface which is opposed to its base wall and against which the interior face of the edge portion the vertical wall abuts, the projection being provided by bending back of the sheet of the edge panel at an acute angle to said edge portion.

6. A container according to claim 5 wherein the vertical panel is suspended by the abutment of its projection at its upper edge with the said side wall of the groove in which that projection is inserted, while the lower edge of the vertical panel does not reach to the lowermost side wall of the groove at the joint to the floor panel.

7. A container according to claim 6 wherein the groove at the joint of the side panel to the floor panel contains a sealing composition which contacts the lower edge of the vertical panel.

8. A container according to any one of the preceding claims wherein at the joints between the adjacent vertical panels, the first panel has a bent back portion providing said projection and the second panel has a groove in which an edge portion of the first panel and said projection are received with resi-

lient deformation.

9. A container according to any one of the preceding claims having at least one said joint between two sh et metal lining panels in which the projection and groove are formed by folding respective edge strips of the material of the panel.

10. A container according to claim 9 wherein in the said joint between two sheet metal lining panels the projection engages by a snap-action behind an overhanging element in the groove, and this joint extends parallel to a joint between two parts of the outer wall of the container.

11. A container according to any one of the preceding claims wherein a sealing agent is provided at least one of the joints at the interior face of the joint.

12. A container according to claim 11 wherein the sealing agent is an elastic material based on silicone rubber.

13. An insulated container having a frame, an outer wall formed of sheet material, an insulating layer within the outer wall and an internal lining comprising a plurality of wood panels covered at their interior faces with plastics material and a plurality of plastics material sections which are secured to edges of the wood panels and form joints between pairs of adjacent wood panels or between a wood panel and another member of the lining, wherein the joints each have a projection and a groove extending substantially the whole length of the joint, the projection being tightly received in the groove.

14. A container according to claim 13 wherein at the joint the edge portion of the said wood panel is received in a groove of a plastics section which has an element constituting the said projection, the projection being engaged with a snap-action in the said groove which is open in the direction perpendicular to the said edge portion of the wood panel.

15. A container according to claim 14 wherein the groove and projection received therein are locked together in the manner of a latch by means of undercut surfaces.

16. A container according to claim 15 wherein the groove is wider than the projection received therein, and support means are provided to urge the projection against a side wall of the groove to maintain the latched condition of said undercut surfaces.

17. A container according to claim 14 or claim 15 wherein the joint is between a wood panel and another member of the lining in the form of a plastics member, the plastics member at one of its edges providing the said projection and the groove being provided by a said plastics section secured to the edge of the wood panel (or *vice versa*), the plastics member at its opposite edge being mounted in a manner permitting pivotting about that edge to p rmit insertion of the projection in the groove.

18. A container according to any one of claims 13 to 17, wherein the wood panels are of plywood coated with glass-fibre reinforced plastics material.

19. An insulated container substantially as herein described with reference to and as shown in Figs. 1 to 5 of the accompanying drawings or modified as shown in Fig. 6.

20. An insulated container substantially as herein described with reference to and as illustrated in Figs. 1a to 5a of the accompanying drawings.

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